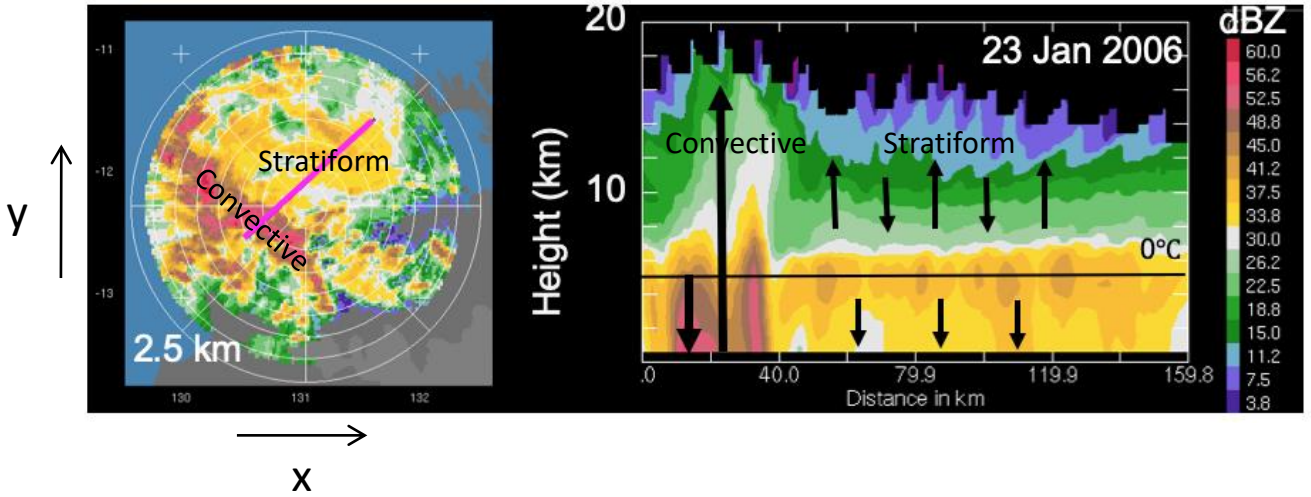
GPM Radar Observations and CAM5 Depictions of Convective and Stratiform Rain over CONUS

Courtney Schumacher and Aaron Funk, Texas A&M University

Emily Riley Dellaripa, Colorado State University

Radar

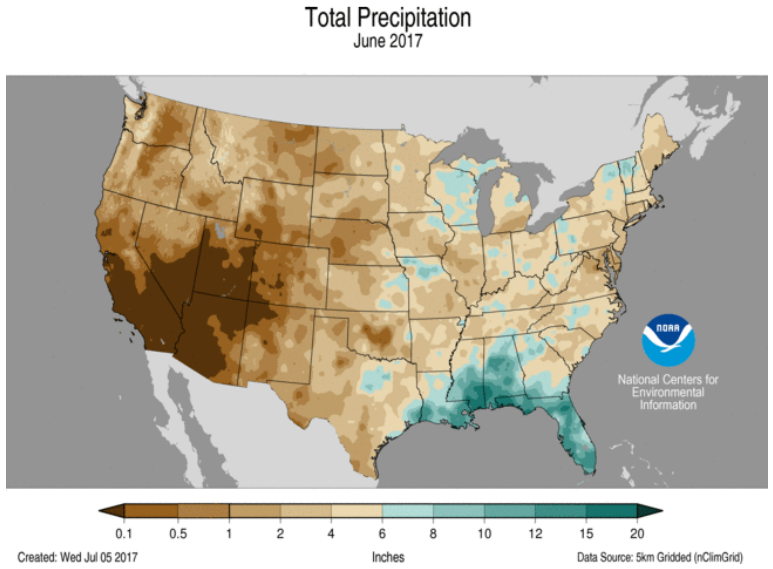


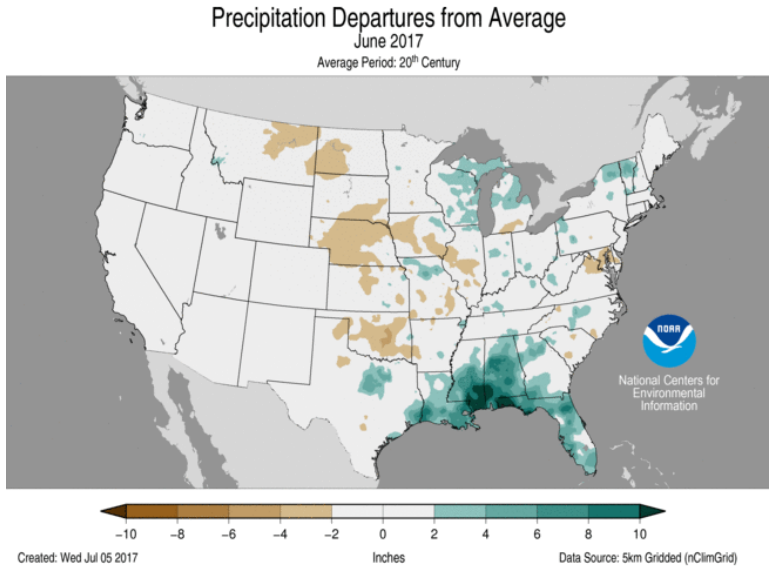
- Radar-based convective-stratiform separation often done using a texture-based algorithm (e.g., Steiner et al. 1995)
- Separates regions of active convection with strong up+down drafts from stratiform regions with much weaker motions

CAM5

- CONVECTIVE: CAM5 uses the Zhang and McFarlane (1995) convective parameterization for deep convection with a modified dilute plume calculation following Raymond and Blyth (1986, 1992) and the addition of convective momentum transport by Richter and Rasch (2008); there is a separate shallow convection scheme based on Park and Bretherton (2009)
- LARGE-SCALE: Large-scale rain and snow is diagnosed in CAM5 using a two-moment bulk microphysics scheme (Morrison and Gettelman 2008)

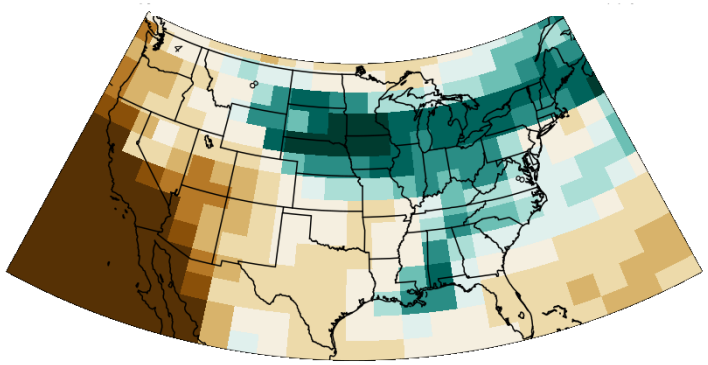
CONUS rainfall - June 2017



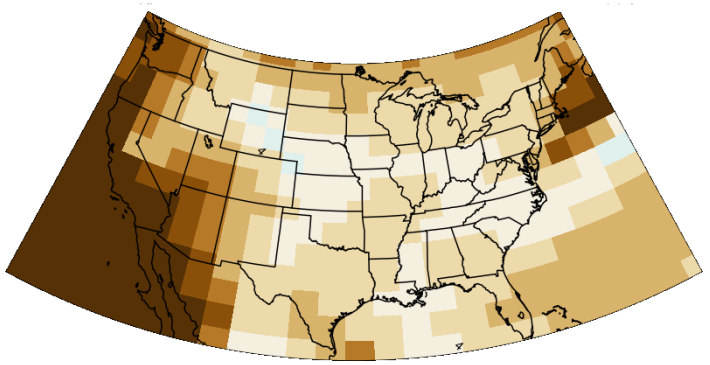


Satellite Image of Tropical Storm Cindy
Source: NASA

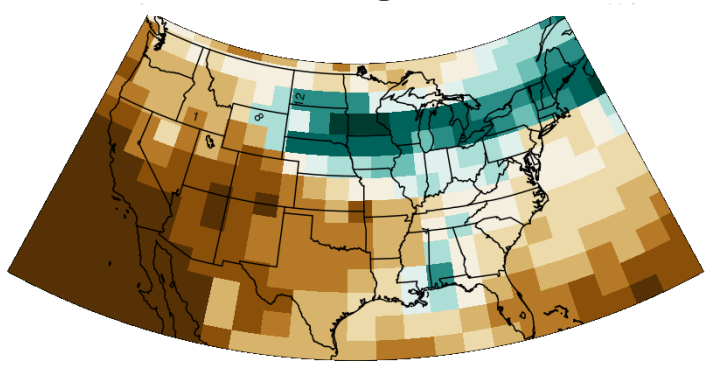
CAM5 total

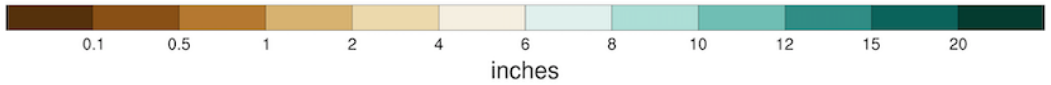


CAM5 convective



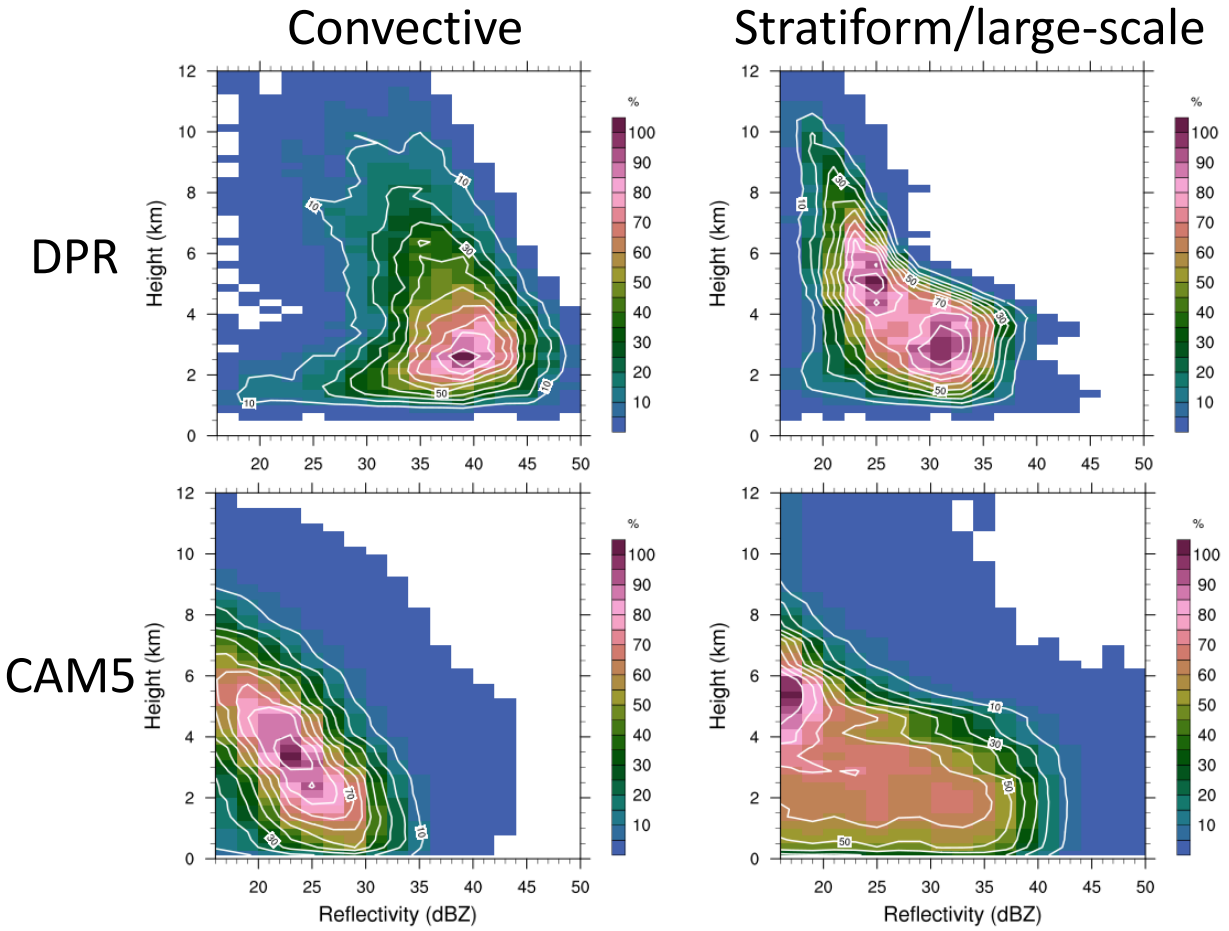
CAM5 large-scale





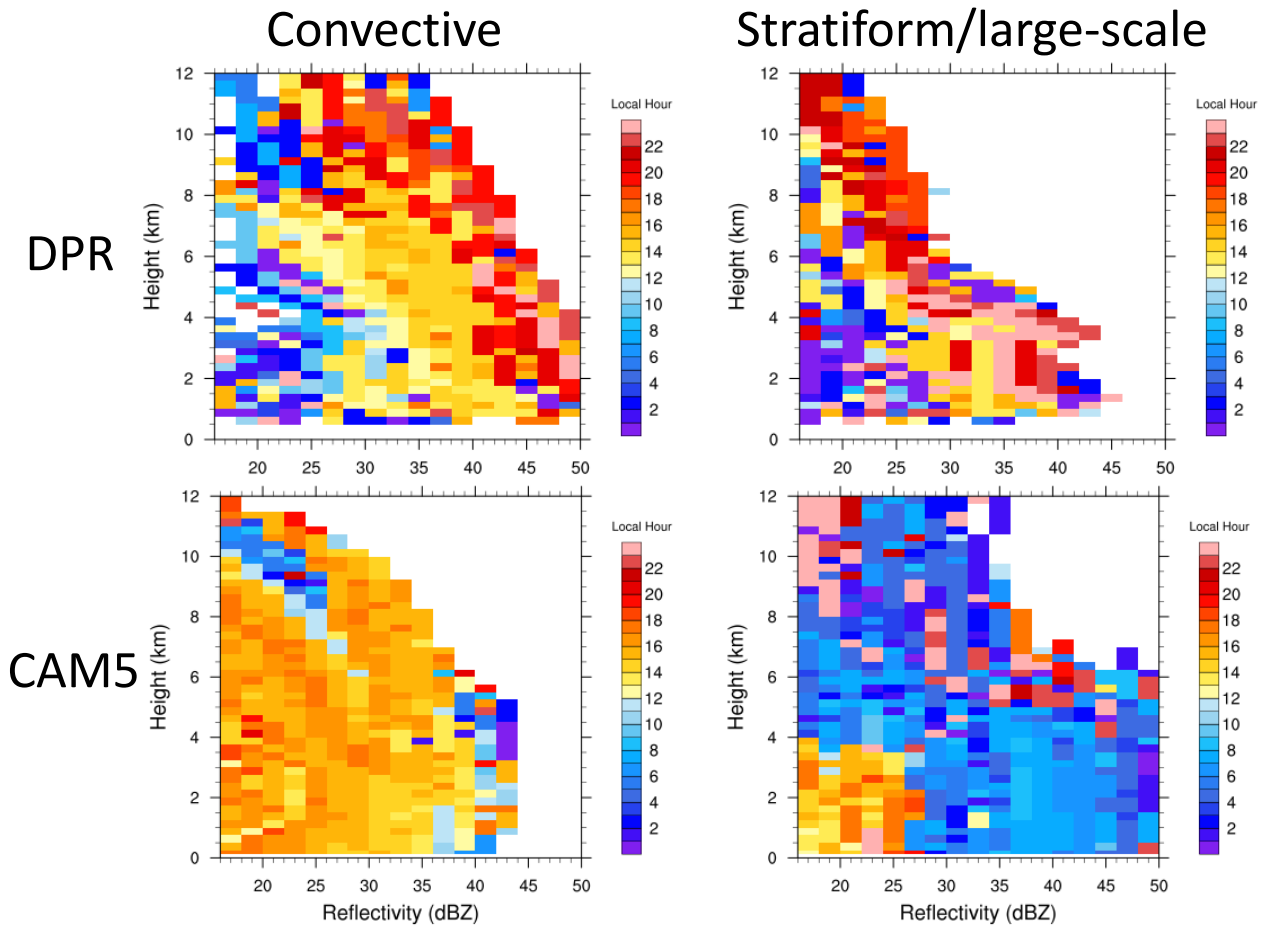
GPM (Jun 2014-2018) vs CAM5/COSP simulator (Jun 2017) 2° CFADs over CONUS

Reflectivity occurrence



- CAM5 convection has similar vertical structure to DPR, but is weaker
- CAM5 large-scale rain similar to DPR stratiform at upper levels, but has much broader low-level reflectivity distribution

Peak hour



- CAM5 convection occurs all at once in mid afternoon, whereas DPR shows evolution of convection with time
- CAM5 large-scale rain maximizes in morning, opposite of DPR